

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A vascular closure assembly, comprising:
 - an anchor;
 - a collagen;
 - a suture coupled to the anchor and extending through the collagen;
 - a housing;
 - a suture locking mechanism residing in the housing, the suture locking mechanism including a wedge shaped portion, wherein the wedge shaped portion of the locking mechanism includes a planar surface that is arranged to engage a planar inner surface of the housing;
 - the suture locking mechanism comprising a non-locked position and a locked position;
 - the vascular closure assembly being adapted so that the suture can pass through the housing in a space defined at least in part between the planar inner surface of the housing and the planar surface of the wedge shaped portion of the suture locking mechanism;
 - wherein the suture would engage the suture locking mechanism such that the suture is capable of movement when the suture locking mechanism is in the non-locked position and the suture is relatively incapable of movement when the suture locking mechanism is in the locked position.

2. (Previously Presented) The assembly according to claim 1, wherein the suture locking mechanism changes from the non-locked position to the locked position by sliding movement.

3. (Previously Presented) The assembly according to claim 2, wherein the suture locking mechanism comprises a suture channel sized for the suture to pass through a portion of the locking mechanism.

4. (Previously Presented) The assembly according to claim 1, wherein
in the non-locked position, the wedge shaped portion of the locking mechanism is spaced apart from the housing and is adapted to be in contact with a suture providing a first amount of frictional resistance to movement of the suture; and

in the locked position, a the wedge shaped portion of the locking mechanism is in engagement with the housing and is adapted to be in contact with the suture providing a second amount of frictional resistance to movement of the suture.

5. (Canceled)

6. (Currently Amended) The assembly according to claim 1, wherein the housing includes a distal open end, and the locking mechanism is movable within the housing in a direction at least partially toward the distal open end when moving from the non-locked position to the locked position.

7. (Currently Amended) The assembly according to claim 1, wherein the wedge shaped portion includes an acute angled portion.

8. (Previously Presented) The assembly according to claim 1, wherein the wedge shaped portion includes an obtuse angled portion

9. (Previously Presented) The assembly according to claim 2, wherein the sliding movement is caused by expansion of the collagen.

10. (Previously Presented) The assembly according to claim 1, wherein the suture locking mechanism comprises at least one channel through the housing.

11. (Original) The assembly according to claim 10, wherein
the at least one channel is arranged such that it provides a substantially non-tortuous suture path when the suture locking mechanism is in the non-locked position; and

the at least one channel is arranged such that it provides a substantially tortuous suture path when the suture locking mechanism is in the locked position.

12. (Original) The assembly according to claim 11, wherein the non-tortuous path is substantially parallel to the suture and the tortuous path has at least a portion that is substantially non-parallel to the suture.

13. (Original) The assembly according to claim 10, wherein the channel is substantially straight.

14. (Original) The assembly according to claim 10, wherein the channel has at least one bend.

15. (Original) The assembly according to claim 10, wherein the channel has a surface comprising at least one of a textured surface, a ribbed surface, a grooved surface, and a notched surface to increase the frictional resistance.

16. (Previously Presented) The assembly according to claim 1, wherein locking mechanism is triangular shaped.

17. (Currently Amended) The assembly according to claim 1, wherein the locking member includes at least three exterior surfaces, the locking member being positioned in the housing so that the suture can engage at least two of the exterior surfaces.

18. (Previously Presented) The assembly according to claim 1, wherein the locking mechanism includes at least one exterior surface arranged for engagement by the suture, the at least one exterior surface being coated with at least one of an adhesive, a mastic, and a tape to increase frictional resistance.

19. (Previously Presented) The assembly according to claim 1, wherein
when the suture locking mechanism is in the non-locked position at least one gap exists
between the housing and the suture locking mechanism and the suture is relatively capable of
movement and when the suture locking mechanism is in the locked position the at least one gap
is closed and the suture is relatively incapable of movement.

20. (Previously Presented) The assembly according to claim 1, wherein the suture
locking mechanism comprises:

at least one pair of mating surfaces, wherein
when in the non-locked position the at least one pair of mating surfaces are separated
from the housing so that the suture is capable of movement and when in the locked position the
at least one pair of mating surfaces are mated with the housing so that the suture is incapable of
movement.

21. (Currently Amended) A vascular closure device, comprising:

an anchor;

a collagen;

a locking device; and

a suture coupled to the anchor and extending through the collagen and the locking device, wherein the locking device comprises:

a housing; and

at least one wedge shaped locking element positioned in the housing, wherein the at least one locking element has a first orientation and a second orientation, wherein the wedge shaped portion of the locking mechanism includes a planar surface that is arranged to engage a planar inner surface of the housing;

the first orientation providing the suture with a relatively non-tortuous path defined at least in part between the planar inner surface of the housing and the planar surface of the locking element; and

the second orientation providing the suture relatively tortuous path defined at least in part between the planar inner surface of the housing and the planar surface of the locking element.

22. (Previously Presented) The closure device according to claim 21, wherein the at least one locking element comprises a channel configured for passage of the suture.

23. (Previously Presented) The closure device according to claim 21, wherein the at least one locking element includes an obtuse angled portion.

24. (Previously Presented) The closure device according to claim 21, wherein the at least one locking element includes at least one of a textured surface, a ribbed surface, a grooved surface, a notched surface, and a channeled surface to increase the frictional resistance.

25. (Previously Presented) The closure device according to claim 21, wherein the at least one locking element comprises an acute angled portion.

26. (Previously Presented) The closure device according to claim 21, wherein the first orientation provides a non-tortuous path substantially parallel to the suture path and the second orientation provides a tortuous path having at least a portion that is substantially non-parallel to the suture path.

27. (Previously Presented) The closure device according to claim 22, wherein the channel is substantially straight.

28. (Previously Presented) The closure device according to claim 22, wherein the channel includes at least one curve.

29. (Previously Presented) The closure device according to claim 22, wherein the channel includes a surface comprising at least one of a textured surface, a ribbed surface, a grooved surface, and a notched surface to increase the frictional resistance.

30. (Previously Presented) The closure device according to claim 21, wherein the housing defines a channel sized to receive the at least one locking element, the housing channel comprising:

a wide end; and

a narrow end, wherein

in the first orientation the suture is relatively adjacent the wide end and in the second orientation the suture is relatively adjacent the narrow end.

31. (Original) The closure device according to claim 30, wherein the narrow end includes at least one of a textured surface, a ribbed surface, a grooved surface, a notched surface, an adhesive, a mastic, and a tape to increase the frictional resistance.

32. (Previously Presented) The closure device according to claim 21, wherein in the first orientation the at least one locking element is spaced apart from the housing to form a gap through which the suture passes and in the second orientation the at least one locking element is adjacent the housing to close the gap.

33. (Currently Amended) A vascular closure device, comprising:

an anchor;

a collagen;

a suture; and

a suture locking assembly, the suture locking assembly including a housing and a wedge shaped locking element positioned in the housing, wherein the wedge shaped portion of the locking mechanism includes a planar surface that is arranged to engage a planar inner surface of the housing;

wherein the suture is coupled to the anchor and extends through the collagen and the suture locking assembly in a space defined at least in part between the planar inner surface of the housing and the planar surface of the locking element.

34. (Previously Presented) The vascular closure device according to claim 33 wherein locking element has at least a first orientation and a second orientation, such that in the first orientation the suture pathway is relatively non-tortuous and in the second orientation the suture pathway is relatively tortuous.

35. (Previously Presented) The vascular closure device according to claim 33, wherein the locking assembly comprises a channel defined between the locking element and the housing, the channel having a first orientation and a second orientation, such that in the first orientation the suture pathway is relatively non-tortuous and in the second orientation the suture pathway is relatively tortuous.

36. (Previously Presented) The vascular closure device according to claim 35, wherein the tortuous suture pathway is formed by a narrowing of the channel.

37. (Previously Presented) The vascular closure device according to claim 34, wherein in the first orientation a gap is formed between the locking element and the housing and in the second orientation the locking element is flush with the housing.

38. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

a wedge shaped locking element positioned in the housing, wherein the wedge shaped portion of the locking mechanism includes a planar surface that is arranged to engage a planar inner surface of the housing;

the locking element having a first orientation and a second orientation relative to the housing;

in the first orientation, the locking element provides a non-tortuous pathway for the suture that is defined at least in part between the planar inner surface of the housing and the planar surface of the locking element such that the suture can move relative to the housing; and

in the second orientation, the locking element provides a tortuous pathway for the suture that is defined at least in part between the planar inner surface of the housing and the planar surface of the locking element such that the suture is relatively immobile relative to the housing.

39. (Previously Presented) The vascular closure assembly according to claim 38, wherein locking element has a first surface area in contact with the suture when in the first orientation and a second surface area in contact with the suture when in the second orientation.

40. (Previously Presented) The vascular closure assembly according to claim 39, wherein the first surface area is less than the second surface area.

41. (Previously Presented) The vascular closure assembly according to claim 39 wherein, the second surface area includes at last one of a textured portion, a ribbed portion, a grooved portion, a notched portion, a channeled portion, an adhesive portion, a mastic portion, and a taped portion.

42. (Previously Presented) The vascular closure assembly according to claim 38, wherein at least one of the housing and the locking element comprises a bio-resorbable material.

43. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

a wedge shaped locking element positioned in the housing, wherein the wedge shaped portion of the locking mechanism includes a planar surface that is arranged to engage a planar inner surface of the housing;

a channel formed in the housing defining a suture pathway;

the locking element having a first orientation and a second orientation relative to the housing;

in the first orientation, the channel provides a non-tortuous pathway for the suture that is defined at least in part between the planar inner surface of the housing and the planar surface of the locking element such that the suture can move relative to the housing; and

in the second orientation, the channel provides a tortuous pathway for the suture that is defined at least in part between the planar inner surface of the housing and the planar surface of the locking element such that the suture is relatively immobile relative to the housing.

44. (Previously Presented) The vascular closure assembly according to claim 43, wherein the channel is straight.

45. (Previously Presented) The vascular closure assembly according to claim 44, wherein the channel comprises at least one curved portion.

46. (Previously Presented) The vascular closure assembly according to claim 43, wherein a greater surface area of the channel is in contact with the suture when in the second orientation than when in the first orientation.

47. (Previously Presented) The vascular closure assembly according to claim 43, wherein the channel comprises:

a wide end; and

a narrow end,

such that the suture would pass relatively closer to the wide end when the housing is in the first orientation and the suture would pass relatively closer to the narrow end when the housing is in the second orientation.

48. (Previously Presented) The vascular closure assembly according to claim 47, wherein the narrow end is sized to snugly fit the suture when in the second orientation and to provide resistance to suture movement.

49. (Previously Presented) The vascular closure assembly according to claim 43, wherein at least one of the housing and the locking element comprises a bio-resorbable material.

50. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

an external housing;

an internal space formed by the external housing;

the internal space having at least one lower surface;

an inner housing assembly;

the inner housing assembly resides in part in the internal space;

the inner housing assembly having a wedge shaped portion that defines at least one mating surface corresponding the at least one lower surface, wherein the at least one mating surface includes a planar portion that is arranged to engage a planar portion of the lower surface of the external housing; and

the inner housing assembly having a first position and a second position, wherein

in the first position, the inner housing assembly is suspended in the internal space such that the planar portion of the at least one mating surface does not abut the planar portion of the at least one lower surface and the suture is relatively moveable relative to the suture locking assembly in a suture space that is defined between the at least one lower surface of the external housing and the mating surface of the inner locking housing; and

in the second position, the inner housing assembly rests on the external housing such that the planar portion of the at least one mating surface abuts the planar portion of the at least one

lower surface and the suture is relatively immobile relative to the suture locking assembly in the suture space.

51. (Previously Presented) The vascular closure assembly according to claim 50, wherein the inner housing assembly includes a channel through which the suture can pass.

52. (Previously Presented) The vascular closure assembly according to claim 50, wherein the suture is threaded through the internal space such that the suture passes adjacent the at least one mating surface, wherein

a tension on the suture causes the suture to apply an opening force on the at least one mating surface so the inner housing assembly does not abut the at least one lower surface.

53. (Previously Presented) The vascular closure assembly according to claim 50, wherein expansion of the collagen provides a force that tends to seat the at least one mating surface and the at least one lower surface.

54. (Previously Presented) The vascular closure assembly according to claim 50, wherein at least one of the housing and the inner housing assembly comprises a bio-resorbable material.

55. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

the housing having a housing pathway for a suture;

a locking device having a wedge shaped portion, wherein the wedge shaped portion of the locking device includes a planar surface that is arranged to engage a planar surface of the housing;

the locking device having a plurality of mating surfaces defined by at least the planar surface of the housing and the planar surface of the locking device, and a locking device pathway for the suture;

the locking device slidably coupled to the housing such that the locking device has at least a first position and a second position relative to the housing;

in the first position, the plurality of mating surfaces provide a gap through which the suture can move relative to the suture locking assembly; and

in the second position, the plurality of mating surfaces abut and grasp the suture so the suture is relatively immobile relative to the suture locking assembly.

56. (Previously Presented) The vascular closure assembly according to claim 55, wherein

the housing further comprises at least a first hole corresponding to the first position and at least a second hole corresponding to the second position; and

the locking device comprises at least a tab capable of engaging at least the first hole in the first position and at least the second hole in the second position.

57. (Previously Presented) The vascular closure assembly according to claim 56, wherein the housing comprises sidewalls, such that the sidewalls provide angle inwards from at least the first hole to at least the second hole.

58. (Previously Presented) The vascular closure assembly according to claim 57, wherein the inward slope of the sidewalls provides a compressive force on the locking device tending to cause the plurality of mating surfaces to move towards each other.

59. (Previously Presented) The vascular closure assembly according to claim 55, wherein at least one of the housing and the locking device comprises a bio-resorbable material.

60. (Currently Amended) A vascular closure device, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

a wedge shaped locking element positioned in the housing, the wedge shaped locking element including a planar surface;

the housing having at least one planar internal sidewall, the planar surface of the wedge shaped locking element being movable into and out of engagement with the planar internal sidewall;

when in engagement, a compressive force between the planar internal sidewall and the planar surface of the wedge shaped locking element causes ~~at least one grasping surface on the at least one sidewall to grasp~~ grasps a suture, and

when out of engagement, the suture is released for unrestricted passage through the housing.

61. (Currently Amended) The device according to claim 60, wherein the at least one planar internal sidewall comprises:

at least one pair of opposed sidewalls;

each pair of the opposed sidewalls have at least one ~~grasping~~ planar surface that abut a surface of the locking element.

62. (Original) The device according to claim 60, wherein a bio-resorbable material is used to make the device.